Blocking Zika virus vertical transmission.

Journal: Sci Rep

Publication Year: 2018

Authors: Pinar Mesci, Angela Macia, Spencer M Moore, Sergey A Shiryaev, Antonella Pinto, Chun-Teng Huang, Leon Tejwani, Isabella R Fernandes, Nicole A Suarez, Matthew J Kolar, Sandro Montefusco, Scott C Rosenberg, Roberto H Herai, Fernanda R Cugola, Fabiele B Russo, Nicholas Sheets, Alan Saghatelian, Sujan Shresta, Jeremiah D Momper, Jair L Siqueira-Neto, Kevin D Corbett, Patricia C B Beltrao-Braga, Alexey V Terskikh, Alysson R Muotri

PubMed link: 29352135

Funding Grants: A treatment for Zika virus infection and neuroprotection efficacy

Public Summary:
We found a FDA-approved anti-viral used to treat Hepatitis C infection (Sofosbuvir or SOF) and re-purposed its used to treat Zika virus infection. Our data show that SOF can block viral replication in human neural cells, can eliminate the Zika virus in two different mouse models and block the transmission from infected pregnant mice to the fetus.

Scientific Abstract:
The outbreak of the Zika virus (ZIKV) has been associated with increased incidence of congenital malformations. Although recent efforts have focused on vaccine development, treatments for infected individuals are needed urgently. Sofosbuvir (SOF), an FDA-approved nucleotide analog inhibitor of the Hepatitis C (HCV) RNA-dependent RNA polymerase (RdRp) was recently shown to be protective against ZIKV both in vitro and in vivo. Here, we show that SOF protected human neural progenitor cells (NPC) and 3D neurospheres from ZIKV infection-mediated cell death and importantly restored the antiviral immune response in NPCs. In vivo, SOF treatment post-infection (p.i.) decreased viral burden in an immunodeficient mouse model. Finally, we show for the first time that acute SOF treatment of pregnant dams p.i. was well-tolerated and prevented vertical transmission of the virus to the fetus. Taken together, our data confirmed SOF-mediated sparing of human neural cell types from ZIKV-mediated cell death in vitro and reduced viral burden in vivo in animal models of chronic infection and vertical transmission, strengthening the growing body of evidence for SOF anti-ZIKV activity.